

MONOLITHIC VENT PIPE FLASHING AND METHOD OF MANUFACTURE THEREOF

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 60/492,936 filed August 6, 2003, entitled “Monolithic Vent Pipe Flashing and Method of Manufacture Thereof”.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates generally to flashing and methods of manufacturing flashing and, in particular, to a monolithic vent pipe flashing for use in connection with a vent pipe projecting from a surface, such as a roof or the like, and a method of manufacturing this monolithic vent pipe flashing.

Description of Related Art

[0003] Virtually every structure, including homes, buildings, etc., include one or more vent pipes extending from a surface of the structure. These vent pipes are used to exhaust air, fumes, gases, steam, vapor and other similar gaseous or semi-gaseous material from the interior of the structure. Since the vent pipe projects from the surface, typically the roof surface, the joint or interface between the body of the vent pipe and the roof surface requires a seal. Specifically, a seal is required, such that rainwater and other debris and material cannot accumulate in the gap between the vent pipe body and the roof surface. Accumulation of debris, water and other material may damage both the vent pipe, as well as the roofing material. Further, leakage can occur and damage the interior of the structure.

[0004] Accordingly, vent pipe flashing has been developed for placement over the vent pipe to prevent such leakage or other damage. Various flashing apparatus and systems have been developed to cover and otherwise seal the interface between the vent pipe and the roof surface or structure. For example, such apparatus and systems are disclosed in U.S. Patent

Nos.: 6,279,272 to Nill, Jr.; 6,244,006 to Shue et al.; 6,102,076 to Romero, Jr. et al.; 6,047,739 to Nixon; 5,694,724 to Santiago; 5,687,773 to Ryan et al.; 5,394,663 to Jackson; 5,036,636 to Hasty; and 4,442,643 to Stadheim. However, such apparatus and systems have several drawbacks.

[0005] These prior art systems are typically made from a single piece or layer of seal material, and this material is fused or bonded directly onto the modified roof membrane. Accordingly, such prior art apparatus and systems require additional caulking and do not provide a multi-layer seal. Also, such prior art systems and apparatus must be constructed on the job site and cannot be prefabricated. Further, prior art apparatus and systems must utilize a specifically cut roof membrane that conforms to the exact shape of the vent pipe. In addition, since prior art apparatus and systems must be attached directly to the roofing membrane, this leads to other drawbacks since the membrane is often rough and does not allow effective sealing.

SUMMARY OF THE INVENTION

[0006] It is, therefore, an object of the present invention to provide a monolithic vent pipe flashing and method of manufacturing thereof that overcome the deficiencies of the prior art. It is another object of the present invention to provide a vent pipe flashing that includes multiple layers and does not require direct fusion or bonding to the roof membrane surface. It is another object of the present invention to provide a vent pipe flashing and a method of manufacturing wherein the vent pipe flashing can be made or prefabricated offsite. It is a still further object of the present invention to provide a vent pipe flashing that allows the roof membrane to be cut in a non-specific manner. It is yet another object of the present invention to provide a vent pipe flashing that does not require additional caulking and provides an effective seal, thereby preventing leakage or other damage to both the vent pipe and the roof surface.

[0007] The present invention is directed to a monolithic vent pipe flashing that can be used in connection with a vent pipe projecting from a surface, such as the roof of a structure. The flashing includes a primary barrier with an upper surface and a lower surface. The lower surface of the primary barrier abuts the surface from which the vent pipe projects. A vent pipe cover is attached to and extends from the primary barrier. The vent pipe cover includes a vent pipe cover bore for receiving a vent pipe. The vent pipe cover bore is defined by a vent pipe body having a first end and a second end. At least a portion of the first end is attached to and overlaps a portion of the lower surface of the primary barrier. The flashing also includes a secondary seal barrier attached to the portion of the first end overlapping the lower surface of the primary barrier.

[0008] The present invention is also directed to a method of manufacturing a monolithic vent pipe flashing. This method includes the steps of: providing a first substantially planar section of material; providing a second substantially planar section of material having a substantially centrally-positioned opening and having an upper surface and a lower surface; providing a third substantially planar section of material having a substantially centrally-positioned opening and having an upper surface and a lower surface; rolling the first section of material into at least one of a substantially tubular or substantially frustoconical shape, thereby creating a vent pipe cover having a first end and a second end and a vent pipe cover bore; inserting the first end of the vent pipe cover through the opening of the second section of material; positioning the first end of the vent pipe cover, such that at least a portion of the first end of the vent pipe cover is abutting and overlapping the lower surface of the second section of material; bonding the overlapping portion of the vent pipe cover to the lower surface of the second section of material; aligning the opening of the third section of material with the vent pipe cover bore; and bonding the upper surface of the third section of material

to at least a portion of the overlapping portion of the vent pipe cover and a lower surface of the second section of material.

[0009] The present invention, both as to its construction and its method of operation, together with the additional objects and advantages thereof, will best be understood from the following description of exemplary embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Fig. 1 is a side sectional view of a vent pipe flashing according to the present invention;

[0011] Fig. 2 is a side sectional view of the vent pipe flashing of Fig. 1 as installed in connection with a vent pipe;

[0012] Fig. 3 is another sectional view of the vent pipe flashing of Fig. 1 as installed in connection with the vent pipe;

[0013] Fig. 4 is a top view of stock material for use in connection with the method of manufacturing vent pipe flashing according to the present invention;

[0014] Fig. 5 is a bottom view of an intermediate step of the method of manufacturing the vent pipe flashing of Fig. 1; and

[0015] Fig. 6 is a further step in the method of manufacturing the vent pipe flashing of Fig. 1.

DETAILED DESCRIPTION OF THE INVENTION

[0016] For purposes of the description hereinafter, the terms “upper”, “lower”, “right”, “left”, “vertical”, “horizontal”, “top”, “bottom” and derivatives thereof shall relate to the invention as it is oriented in the drawing figures. However, it is to be understood that the invention may assume various alternative variations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification,

are simply exemplary embodiments of the invention. Hence, specific dimensions and other physical characteristics related to the embodiments disclosed herein are not to be considered as limiting.

[0017] The present invention is directed to a monolithic vent pipe flashing 10 and method of manufacturing this vent pipe flashing 10. A preferred embodiment of the vent pipe flashing 10 is illustrated in Figs. 1-3, and several steps in the method of manufacturing the vent pipe flashing 10 are illustrated in Figs. 4-6. Further, the vent pipe flashing 10 is particularly adapted for use in connection with a vent pipe 12 that projects from a surface 14 of a structure (not shown), such as a building, home, etc.

[0018] In a preferred and non-limiting embodiment, the vent pipe flashing 10 includes a primary barrier 16 having an upper surface 18 and a lower surface 20. The lower surface 20 of the primary barrier 16 abuts the surface 14 from which the vent pipe 12 projects. The vent pipe flashing 10 also includes a vent pipe cover 22 attached to and extending from the primary barrier 16. The vent pipe cover 22 includes a vent pipe cover bore 24 and is sized and shaped such that it can receive the vent pipe 12. This vent pipe cover bore 24 is defined by a vent pipe cover body 26 having a first end 28 and a second end 30. At least a portion of the first end 28 of the vent pipe cover body 26 is attached to and overlaps a portion of the lower surface 20 of the primary barrier 16. Finally, the vent pipe flashing 10 includes a secondary seal barrier 32 that is at least partially attached to a portion of the first end 28 of the vent pipe cover body 26 that overlaps the lower surface 20 of the primary barrier 16.

[0019] As seen in Fig. 1, a triple-seal area is provided at the interface or vent pipe cover bore 24 portion of the vent pipe cover 22. While this view is exaggerated and it appears that the secondary seal barrier 32 and first end 28 of vent pipe cover body 26 project from the primary barrier 16, as detailed hereinafter, the method of manufacturing the vent pipe flashing 10, including the bonding of these surfaces, provides a more uniform and

substantially flat surface. The bonding process may be a heat fusing process or an adhesive material may be used to attach the layers. The view of Fig. 1 was exaggerated to better illustrate the primary barrier 16, the vent pipe cover 22 and secondary seal barrier 32. In addition, it is envisioned that the vent pipe flashing 10 can be manufactured from any number of suitable materials, such as rubber, a polymer or other synthetic material. However, in one preferred and non-limiting embodiment, the vent pipe flashing 10 is manufactured from a bitumen material.

[0020] Further, as seen in Fig. 1, the vent pipe cover 22 may have a substantially tubular shape, or alternatively, may have a frustoconical shape. In using a frustoconical shape, the vent pipe cover 22 allows rain and other liquid or similar material to more easily traverse down the vent pipe cover body 26 and not pocket in any area of the vent pipe flashing 10. This, in turn, assists in the longevity and effectiveness of the vent pipe flashing 10.

[0021] The vent pipe flashing 10 according to the present invention, as installed on the surface 14 surrounding the vent pipe 12 is illustrated in Figs. 2 and 3. Specifically, the vent pipe flashing 10 and, in particular, the vent pipe cover portion 22 is placed over the vent pipe 12. In this manner, the vent pipe 12 extends through the vent pipe cover bore 24, and the vent pipe cover 22 is sized such that the vent pipe 12 extends beyond the second end 30 of the vent pipe cover body 26.

[0022] In order to further attach the vent pipe flashing 10 to the vent pipe 12, an attachment mechanism 34 is used. Any number of attachment mechanisms 34 are envisioned, such as clamps, ratchets or other manner of securing the second end 30 of the vent pipe cover body 26 to the vent pipe 12. Once installed, the primary barrier 16 and the secondary seal barrier 32 abut the surface 14, in this embodiment, the roof membrane surface 36. Below the roof membrane 36 typically is an insulation layer 38, and below this insulation layer 38 is the roof deck 40. As installed, the vent pipe flashing 10 of the present invention

provides a secured and sealed area around the interface between the vent pipe 12 and the surface 14. It is also envisioned that the lower surface 20 of the primary barrier 16, or at least a portion thereof, is attached to the surface 14, such as by use of an adhesive material.

[0023] The present invention is also directed to a method of manufacturing the vent pipe flashing 10. First, a first substantially planar section of material 42 is provided. Also provided are a second substantially planar section of material 44, which includes a substantially centrally-positioned opening 46 and a second section of material upper surface 48 and lower surface 50. A third substantially planar section of material 52 is also provided, and like the second section of material 44, the third section of material 52 includes a substantially and centrally-positioned opening 54 and includes an upper surface 56 and lower surface 58.

[0024] The first section of material 42 is rolled into a substantially tubular or substantially frustoconical shape, which creates the vent pipe cover 22 as discussed above. Next, the first end 28 of the vent pipe cover body 26 is inserted through the opening 46 of the second section of material 44. The first end 28 of the vent pipe cover body 26 is positioned, such that at least a portion of the first end 28 of the vent pipe cover body 26 is abutting and overlapping the lower surface 50 of the second section of material 44. One manner of providing this abutting interface is to “finger” the first end 28 of the vent pipe cover body 26, such as is shown in Fig. 5.

[0025] Next, the overlapping portion 60 of the vent pipe cover portion 22 is bonded to the lower surface 50 of the second section of material 44. The opening 54 of the third section of material 52 is aligned with the vent pipe cover bore 24. Finally, the upper surface 56 of the third section of material 52 is bonded to at least a portion of the overlapping portion 60 of the vent pipe cover portion 22, as well as the lower surface 50 of the second section of material 44. Once complete, the vent pipe flashing 10, as described above, is manufactured.

[0026] In one preferred and non-limiting embodiment, the first end 28 of the vent pipe body cover 26 is heat fused to the lower surface 50 of the second section of material 44 (the primary barrier portion 16). See Fig. 5. Once the first end 28 is fused, a “buttering” technique is used to melt the first end 28 and create a more uniform lower surface 50 of the second section of material 44.

[0027] Similarly, the third section of material 52 (the secondary seal barrier portion 32) is heat fused to the lower surface 50 of the second section of material 44. See Fig. 6. As with the first end 28 of the vent pipe cover body 26, the third section of material 52 may be “buttered” to again provide a uniform lower surface 50 of the second section material 44. Using a “buttering” technique, the lower surface 50 remains substantially planar, which creates a better seal between the vent pipe flashing 10 and the surface 14.

[0028] In this manner, a vent pipe flashing 10 and method of manufacturing thereof are provided that overcome the drawbacks of the prior art. The vent pipe flashing 10 according to the present invention includes three pieces of heat-fused material and is usable in any vent pipe 12 that is similar in size. The present method of manufacture allows the vent pipe flashing 10 to be pre-made or prefabricated away from the job site, which allows for the storing and selling of this vent pipe flashing 10 for use in various applications and for use with various structures. The size of the primary barrier 16 and secondary seal barrier 32 allows the surface 14 (roof membrane surface 36) to be cut around the vent pipe 12 in a non-specific manner, which saves additional time to the installer. Still further, the present method and vent pipe flashing 10 is particularly useful and accounts for tar or roofing buildup at the bottom of the vent pipe 12. The present method and vent pipe flashing 10 does not require any additional caulking and has a multi-surface and beneficial effective seal around the vent pipe 12.

[0029] This invention has been described with reference to the preferred embodiments. Obvious modifications and alterations will occur to others upon reading and understanding the preceding detailed description. It is intended that the invention be construed as including all such modifications and alterations.